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Authority NND 83930

FOIA CASE # 44472

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DRAFT
TAB
HH
4/16/62

SCHEDULING OF PROBLEM II

Target date for final report to be transmitted to Chairman, MLC: July 1, 1962.

Note: outline calls for supplementary report by Sept. 1, 1962, on the most urgent steps needed for improving methods of estimation.

Schedule to meet target date:

- Wednesday, April 18th afternoon planning meeting:

- fix technical approach to problem (review outline)
- fix general division of labor between AEC and various DoD groups**
 - fix arrangements for computer time and money
- fix liason arrangements among various working groups
- fix the nature of a memorandum to Chairman, MLC on the above
- fix next immediate steps

**Note: see next page for notes on division of labor and on coordination.

- DBM task forces to meet with me for the first time (one day each, at most) not later than the week of May 7; purpose is to get groups oriented to problem and approach being taken and fix on precise nature of information they will require to carry out their estimations and evaluations.
- prompt damage assessment estimate (calculations and summaries of results) should be completed by the week of May 21.
- I will work with the DBM group on world-wide fallout deposition estimates and radionuclide uptake estimates between about May 24 and May 29, although some of this work may slip over into the first week of June.
- The three DBM task groups on biological effects should plan on working as much time as required of the week of June 11th, spilling over into the next week as needed. From each of these groups (and from Worldwide fallout group) I will expect to receive a written memorandum of assumptions used and the summary of actual estimates and evaluations.
- I will use the last two weeks of June to tie all of the material together into a final report, and for review before transmittal.

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Division of responsibility:

- Attack assumptions in final form: Dr. Miller, Mr. Crowley, and HH
- Assumptions on radiological decay, fractionation, shielding factor, and partitioning of debris: Dr. Miller, Mr. Crowley, and HH. Concurrently with our work, I will submit a summary memorandum of information to DBM Fallout Studies Branch for review and comment, as well as for advance notice for their participation.
- The prompt damage assessment calculation, including estimates of radiation doses to survivors up to the problem "starting time": to DODAC (Mr. Crowley).

Note: it will be DODAC's responsibility to come up with an estimate by the time due irrespective of possible technical refinements to the model; naturally it would be desirable to incorporate the more obvious and important improvements in advance.

- The world-wide fallout deposition calculation (using DODAC input information): to DBM Fallout Studies Branch working with Dr. Miller and HH.
- Estimates of radionuclide uptake in the food chain: to Fallout Studies Branch working with HH.
- Estimates of biological effects: to DBM special task groups working with HH.

Nature of final report (see outline):

To be relatively brief in text, with free use of tables for condensing and presenting information, with the text devoted to essentially two goals: (i) presenting and discussing the problem and the approach used, including the major assumptions; (ii) discussing the results, leading to some sort of conclusion with reference to the context of the study.

DODAC and other DoD groups working on the problem will be expected to provide summary memoranda covering assumptions and results of their parts of the work.

Coordination:

To be informal as possible, utilizing telephone and informal memorandum to avoid as much as possible trips from Germantown to the Pentagon or vice versa. Primary purpose of memos is to confirm agreements and keep groups together and current.

It is assumed that DoD (DODAC?) will handle its own administrative arrangements with respect to computer services; however, for information only, I would like to receive a summary of the costs and time required.

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PROBLEM II. OUTLINE OF REPORT

Title of Report: The Biological and Environmental Consequences of a Nuclear Attack Using "Clean" Weapons - A Brief Study

Organization and Topics of the Report: 1/

I. Introduction

A. Description of the Study Problem

B. Approach to the Study

II. Description of the Attack Assumptions

III. Results of the Study

A. Estimate of Effects on Persons Surviving

B. Estimate of Effects on Surviving Livestock and Poultry

C. Estimate of Effects on Cropland, Forests, and Ranges

IV. Conclusions

Appendix: Estimation of Radiation Exposure Levels and Radionuclide Contamination Levels

1/ See following pages for further development of topics

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Further development of outline topic I:

A. Description of the study problem

- point toward the conclusions by suggesting what questions this report is addressed to
- point out limitation of subject to matter primarily biological, including ecological, especially the economically important biological environment

B. Approach to the study

- purpose of considering the problem is related to ~~policy decisions~~ on ~~production~~ and use of "clean" weapons; a minimal study should, therefore, estimate effects both absolutely and by comparison with a corresponding attack using "standard" weapons.
- time limitation is severe; the essence of the study method, therefore, is the use of standard information on biological effects, where available, and standard calculation models incorporating standard assumptions for radiation exposure and radionuclide contamination levels.
- interlocking effects are, by and large, ignored, such as: (i) radionuclide uptake through the food chain is estimated using data for healthy plants and animals, (ii) latent biological effects are estimated independently of each other, and (iii) denial time for land use would not be determined on the basis of the users having already been exposed to radiation, etc.
- a "starting time" for the problem has been used which is different than (later than) the time of the attack itself; this time has been picked so as to eliminate from consideration as a part of the study the prompt, acute effects of blast, thermal radiation, and ionizing radiation; such effects are included in the prompt damage assessment calculation which forms part of the "input" information for the study problem.
- from the "starting time" of the study problem onward, protective or recovery measures for the survivors are ignored.
- in general, the approach is one of "cutting corners" and "rounding off"; but, besides that, information is meagre in any event for much of the problem; a supplementary report will be issued about September 1, 1962 on the more urgent steps needed for improving the estimates making up the study.
- numerical estimates are usually expressed as ranges which are to be regarded as the result of differing assumptions as well as of uncertainty in information.

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Further development of outline topic II:

(Description of attack assumptions)

No. of cases

1. Size of attack: 1000 and ~~4000~~ ^{1000, 3000, 10,000 MT} total yield

2

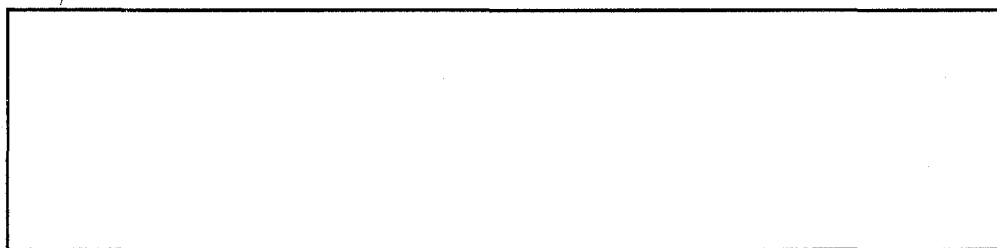


2

3. Type of attack: all surface burst (land) and all

FOIA(b) (3) - 42 USC 2162(a) - RD DOE EO13526 6.2(a)

2



1

6. Time of day, month, season, year, duration; the weather, and other circumstantial assumptions that are relevant

1

6 **

4. military test, ^{only} in mixed

** not the total number of cases for prompt damage calculation, because of radiological assumptions to be varied

Further development of outline topic III:

A. Estimate of effects on persons surviving

- assumptions used in the prompt damage calculation to define a "survivor" in terms of such questions as: (i) how was the "starting time" of the study problem picked (e.g. a time = 1 yr or less when the mortality rate dropped to "normal"), (ii) the life-expectancy distribution of the survivors, (iii) the radiation-mortality assumptions used, and (iv) ERD assumptions used.
- a summary estimate of the cause of death of those who did not survive to the "starting time" of the problem; in particular, breaking out those who died from fallout radiation.
- an estimate of the cumulative and ERD dose distribution among the survivors received up to the "starting time" and afterwards, so broken down.
- statement of the biomedical assumptions used in evaluating the exposure data
- qualitative description, using standard radiation syndrome characteristics, of the health of the survivors at picked times starting with the "starting time".
- numerical estimates of the incidence of some latent effects, including genetic effects, in the survivors.

B. Estimate of effects on surviving livestock and poultry

- mortality information, generalized
- description of the capacity of the animal and poultry population to provide food and to breed new stocks

C. Estimate of effects on cropland, forests, and ranges

- condition at "starting time"
- estimate of degree of contamination
- estimate of any very high exposure dose rates
- numerical estimates of contamination levels of selected radionuclides
- discussion of ability of cropland, forests, and ranges to produce

Appendix: Estimation of radionuclide contamination and radiation exposure levels

A.
 FOIA(b) (3) - 42 USC 2162 (a) - RD DOE EO13526 6.2 (a)

Estimates of radionuclide production by the weapons: MFP, Sr⁹⁰, Cs¹³⁷, I¹³¹, "short-lived" gamma emitters and Sr⁸⁹, induced activities in soil and in weapon material, C¹⁴ - it is necessary to make an assumption about solid-angle for neutrons in surface bursts (50-50 or 2/3-1/3, etc.) - specifically want Mc of induced activities produced ("of importance"), distributed by size of weapon and type of burst so can be related to MFP.

- B. Assumptions about fractionation and partitioning of debris into local, tropospheric world-wide and stratospheric world-wide components

Estimates of amounts of debris, broken down by specific nuclides as above, going into the three categories of fallout

Assumption about radiological decay ($t^{-1.2}$, NRDL, etc.)

Assumptions about shielding factor (defined as the ratio of the dose received upto the "starting time" to the dose received if not protected; of course, the number of survivors changes too)

Assumptions about residence time and latitudinal distribution of world-wide fallout

Other important assumptions used in the prompt damage calculation, emphasizing those dealing with fallout

- C. Summary of prompt damage assessment calculations

1. What survives up to "starting time" of problem
2. Of those who did not survive, breakdown of cause of death, with particular reference to radiation deaths and fallout deaths
3. Land contamination levels at "starting time" - gamma dose rate, contamination levels of selected radionuclides

- D. Summary of world-wide fallout deposition estimate

1. Radionuclide deposition levels and rate of build-up
2. C¹⁴ levels in biosphere

- E. Estimate of uptake of internal emitters into persons (& livestock), including major assumptions

1. Biological "availability"
2. "Transfer coefficients"

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F. Estimate of total radiation exposure dose to persons (& livestock).

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